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THE VOLUME AND NATURE OF INLAND WATER TRAFFIC IN THE USSR

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THE VOLUME AND NATURE OF INLAND WATER TRAFFIC IN THE USSR *

Summary

The Soviet inland water fleet is estimated to comprise about 5,000 self-propelled vessels (passenger ships, freighters, and tugs) totaling about 1 million horsepower and 9,400 non-self-propelled vessels (barges and lighters) with a total capacity of 7,932,000 metric tons. The severe losses of World War II have been more than overcome, and the fleet is considerably larger than it was before the war. Reparations from the Satellites, especially from East Germany, and an extensive domestic salvaging program are largely responsible for the rapid recovery of the fleet.

The Soviet inland water fleet is estimated to be in fair condition. Although barges in the fleet generally range from small craft of 80 to 800 metric tons, units up to 12,000 metric tons are reported to be in use on some of the large rivers. Tugs used range up to 1,500 horsepower on the large waterways and from 30 to 250 horsepower on smaller routes. Technical developments in ship construction, including serial construction and the use of steel rather than wood for construction, have contributed to increased fleet efficiency. Considerable attention is being given to improving communications for vessel dispatching and control, which appear to be very inefficient.

The Soviet inland water fleet is expected to continue to increase in size and quality during the next few years, but the increase will be fairly slow. The self-propelled fleet is expected to expand at the rate of from 6 to 8 percent, or 65,000 to 85,000 horsepower, annually. Barge capacity is expected to increase from about 7 to 10 percent, or about 600,000 to 800,000 metric tons, annually.

The performance of the Soviet inland water fleet is apparently very poor. For example, during 1950, ships of the Volga Freight Ship Line were idle 55.8 percent of the time. Poor work organization and poor management at ports and wharves appear to be major factors in the inefficient operations of the inland water fleet.

* This report contains information available as of March 1953.

The area from the Polish border east through the Volga system accounts for the bulk of the Soviet inland water fleet. The planned distribution in 1950 allocated to that area 79 percent of the horsepower of the self-propelled fleet and 86 percent of the tonnage capacity of the non-self-propelled fleet. Within that area the largest single concentration is found in the Central European Basin.*

The USSR possesses an excellent network of inland water ports. There are at least 66 ports whose size, location, or traffic classify them as of significance to Soviet inland water traffic. Ports of major importance are scattered throughout the USSR, but there is a concentration in the area west of Astrakhan'. Despite the fact that this area comprises less than 15 percent of all Soviet territory, 38 of the major ports are west of Astrakhan'. About one-fourth of all the important ports are located on the Volga system (the Moscow Canal and the Volga, the Oka, the Kama, and the Moskva rivers).

In 1940 the ports in the Central European Basin accounted for 68.6 percent of all ton-kilometers of traffic handled by the Soviet inland wate system; the Northern European Basin accounted for 14.3 percent; the Eastern (Siberia) Basin, comprising the area east of the Urals and probably third in capacity, accounted for about 11.2 percent; and the Southern European Basin, which is mostly around the Black Sea, with the smallest capacity of all, accounted for only 5.9 percent. Data on the cargo capacity of individual ports are not available, but the Ministry of the River Fleet (Glavvodput') has stated that 14 river ports annually handle over 500,000 metric tons of cargo, that 26 ports handle from 200,000 to 500,000 metric tons, and that 30 ports handle from 100,000 to 200,000 metric tons.

It is estimated that the volume of traffic carried by the Soviet inland water system in 1951 reached 105.6 million metric tons, or 51 billion ton-kilometers. Traffic in 1952 was expected to total about 119 million metric tons or about 59 billion ton-kilometers.

Soviet inland water traffic consists primarily of bulk cargoes. The major item of traffic is lumber, which is usually towed in rafts but which also constitutes a large portion of barge traffic. Other important barge cargoes are building materials, petroleum, grain, coal, and salt. Although there are numerous inland water routes and systems in the USSR, only 17 are of major importance.

* Basin is a term used to describe an area drained by a group of rivers in a contiguous geographic area.

A significant measure of the value of inland water transport to the USSR lies in the great emphasis which the Soviet government itself presently places on river traffic, as seen from the extent of restoration and construction programs.

I. Introduction.

Inland water transport is of considerable importance in the USSR today and was even more so in the days of the Tsarist regime. Before the advent of railroads, the rivers, seas, and lakes were virtually the sole inland transport routes for domestic traffic and, at the same time, furnished routes to ocean ports for export cargoes.

The advent and expansion of the railroads changed this almost total dependence on water transport. The shift was fairly gradual, however, and in 1913 inland water traffic totaled 33.7 million metric tons and still accounted for the transportation of nearly one-third (31.9 percent) of all domestic freight.

The Russian Revolution, with its widespread destruction of the inland water fleet and the Soviet policy of moving industry into the interior (largely deficient in river transport), decelerated the participation of water transport in Soviet domestic traffic. By 1928 the share of inland water transport in domestic traffic declined to 14.5 percent and in 1932 to 13.7 percent and on downward, so that a present inland water transport carries only about 8 to 10 percent of all domestic freight. (This trend in the volume of inland water traffic is shown in Table 1.)*

* Table 1 follows on p. 4.

Table 1

Volume of Soviet Inland Water Transport
(including Towed Lumber)
1925-52

Year	Metric Tons (Millions)	Ton-Kilometers (Billions)
1925	24.3	14.8
1926	32.8	19.8
1927	25.0 a/	18.2 a/
1928	18.3	15.9
1929	23.2	18.4
1930	36.6	22.9
1931	44.7	27.0
1932	47.0	25.0
1933	44.7	25.8
1934	53.3	29.0
1935	64.7	33.9
1936	69.9	31.1
1937	67.0	33.0
1938	66.6	32.0
1939	73.0	35.0
1940	73.7	36.0
1941	N.A.	N.A.
1942	N.A.	28.8
1943	N.A.	29.4
1944	N.A.	N.A.
1945	35.7	16.4
1946	39.3	20.4 b/
1947	48.2	25.1
1948	61.0	31.1
1949	73.8	37.6
1950	81.2 c/	45.2
1951	105.6	51.0
1952	118.6	58.5

a. Estimated on the basis of data shown for 1926-28.
b. Estimate from Soviet rail data and average length of haul reported from river transport in 1946.
c. The ton-kilometers for 1950 divided by average length of haul in river transport planned for 1950.

II. Capabilities of the Soviet Inland Water Fleet.

A. Size and Quality.

1. Size.

There is little reliable or detailed information on the inventory of the Soviet inland water fleet. The USSR has issued no comprehensive fleet statistics for a number of years, and estimates must necessarily depend upon Western interpretations of deliberately vague Soviet data. Table 2 presents the best available statistics on the size of the Soviet inland water fleet. The two types of vessels considered are (a) self-propelled vessels (passenger ships, freighters, and tugs) and (b) non-self-propelled vessels (barges and lighters). The number of self-propelled barges in the USSR is negligible.

Table 2

Size of the Soviet Inland Water Fleet
Selected Years 1913 to 1952

	Self-Propelled Vessels		Non-Self-Propelled Vessels	
Year	Number	Horsepower	Number	Capacity (Metric Tons)
1913	5,302	1,039,000	23,149	13,678,000
1933	2,234	588,800	7,024	5,514,000
1935	2,415	566,800	6,366	5,390,900
1938	3,386	795,800	6,270	5,831,000
1939	2,250	723,000	7,900	8,060,000
1941	4,060	744,000	8,700	5,700,000
1945	3,148	610,000	5,644	3,800,000
1950	4,722	910,000	8,142	6,800,000
1951	4,914	982,800	8,680	7,344,000
1952	5,032	1,061,400	9,376	7,932,000

It is apparent from Table 2 that the losses of World War II have been recouped. The number of self-propelled vessels is double that of 1939, and the horsepower of the self-propelled fleet is about 40 percent more than in 1939. The number of non-self-propelled vessels is nearly one-fifth greater than in 1939. Carrying capacity is, however, slightly less than in 1939, probably because of the loss of a large number of barges on the Volga system during the war.

The progress toward rehabilitation and expansion of the Soviet inland water fleet is all the more remarkable in view of the devastation suffered during the war. The exact extent of such destruction has never been ascertained, but the Ministry of the River Fleet (Glavvodput') has stated that the USSR lost 4,280 self-propelled vessels and 4,029 non-self-propelled vessels. It should be noted, however, that the rapid recovery of the fleet inventory has been brought about as much by reparations from the Satellites, especially from East Germany, and by an extensive domestic salvaging program as it has by postwar construction in Soviet shipyards.

2. Quality.

a. Physical Condition.

Soviet inland water fleet is considered to be in fair condition. Although many units are in poor condition, considerable effort has been made since the end of World War II to improve both the fleet and its operating efficiency. Information is available on the general characteristics of the two main types of river craft, barges and tugs. It is known that most Volga River barges, tankers as well as dry-cargo barges, range between 1,000 and 4,000 metric tons. Although some large (12,000-ton) tankers are in use, and 1,500- and 3,000-ton barges are commonly used on the large rivers, most barges range from 80 to 800 metric tons and have an average draft of 0.6 to 1.5 meters. Tugs used on the large waterways range up to 1,500 horsepower and are either screw-propelled or paddle-wheel-propelled. On other waterways, tugs range from 30 to 250 horsepower and are mostly paddle-wheel-propelled. (A shallow-draft, twin-screw type is being developed.) Most freight and passenger boats used on Soviet waterways are old, and many are paddle-wheel-propelled.

The age of the Soviet inland water fleet is a major factor contributing to its present unsatisfactory status. In 1945, for example, 55 percent of all tugs were over 25 years old. Barges are also well beyond the point of operating efficiency. In 1945, 30 percent of all barges in the Soviet Far East were over 20 years old, and those in Siberia were undoubtedly much older.

Since the end of World War II, considerable effort has been expended to modernize the fleet and to improve its operations. Soviet sources report numerous technical developments in recent years which cut costs in all aspects of river transport. Technical developments in construction have greatly increased barge carrying capacities. One technical development is the trend toward the use of steel instead of the more commonly used wood construction methods. Serial construction of single types of vessels has resulted in up to 50-percent reductions in costs of construction. Greater cost reductions are forecast as a result of the expansion of modern continuous-production methods. Electric welding has resulted in a 5- to 10-percent saving of metal in the construction of steel vessels as compared with old-style riveted vessels. The resulting reduced weight and bulk of vessels has made it possible to convert more rapidly from paddle wheels to screw propulsion, with the result that 41 percent of all river vessels built during the last 30 years have screw propellers. Paddle-wheel units are, however, extensively used, especially in shallow waters. The new, large 1,200-horsepower paddle-wheel tugs are claimed to exceed the best European and Soviet types by 10 to 15 percent in cargo capacity.

The increasing use of internal-combustion engines has resulted in considerable savings in operating costs; 30 percent of the total number of vessels are reported to be of this type. These compact engines have made possible special fleets of small vessels which are suitable for shallow rivers.

The use of modern diesels in place of oil-burning steam engines has resulted in up to 75-percent reductions in fuel consumption. On lines where steam engines are employed, the use of a new type of unit with higher pressure, with water-tube boilers, and with more up-to-date auxiliary mechanisms has also made it possible to reduce fuel consumption considerably.

It appears that considerable attention is being given to improved communication between vessels and dispatching and control points, as well as between individual vessels. Ships in the Western regions are being equipped with two-way radios. Complaints of poor operations, however, indicate that equipment is not being used very efficiently. Until recently there was no organized training of radio operator specialists, and many ships' radio stations were idle because of a lack of trained personnel. In some cases, ship lines have given short training courses to radio operators, but these courses are not at all adequate. Ship-to-shore communications are in the experimental stage and are carried out very unsatisfactorily. According to the schedule approved by the Main Administration

of Communications (Glavsvyaz'), shore radio stations on the Volga and Kama rivers work on different schedules. For example, at Astrakhan' the radio operates 24 hours daily, but the station up the Volga at Saratov is active only four times daily for periods of 1 hour. At Kuybyshev the station is open all during the day but for only 15 minutes an hour at night. All shore stations operate on different wave lengths, and each has its own operating procedures and methods of radio traffic.

Part of the reason for confusion in radio communications is that operating procedures are decided by individual ship lines according to their own interests. For example, each ship line sets up a radio network within the area of its activity to satisfy its own requirements without coordinating its work with the needs of other lines.

b. Operations.

The performance of the Soviet inland water fleet is apparently very poor. For example, during the 1950 season, the Main Administration of the River Fleet of the Central Basins (Glavtsentroflot) did not organize operations properly, and the layover time of the freight-carrying diesel ships was said to have reached enormous proportions. In the Volga Freight Ship Line, ships were idle 55.8 percent of the time, and in the Moscow-Volga Canal Ship Line the figure reached 70.5 percent.

Freight was delivered on schedule during 1950 by only 48 percent of the freighters of the Volga Freight Ship Line, 21 percent of the freighters of the Northwestern Ship Line, 31 percent of the freighters of the Lower Irtyah Ship Line, and 34 percent of the freighters of the Yenisey Ship Line. In the Moscow-Volga Canal Ship Line, over 33 percent of the freighters, and in the Volga Freight and Passenger Ship Line, 30 percent of the freighters made late deliveries.

Vessels are frequently held up because of poor work organization and poor management at the ports and wharves. Time spent during 1950 in loading and unloading operations in the river ports exceeded the established norms by 29 percent in the Ministry of the River Fleet as a whole, 36 percent in the Volga Freight Ship Line, and 30 percent in the Kama Ship Line.

Glavtsentroflot evaluated this aspect of the fleet's operations and issued a directive on 14 April 1951 which provided for the organization of 12 ship lines, 9 of which were to go to Moscow. This change probably represents reorganization of existing facilities. Self-propelled freighters

were distributed among these lines. The directive includes a freight shipment timetable, and to assure the shipment of non-scheduled freight, 23 additional diesel ships were assigned to work on route traffic.

B. Over-All and Regional Capacities of Fleet and Port Facilities.

1. Fleet Distribution

Administratively and geographically the Soviet inland water system is divided into four basins: (a) the Northern European Basin, (b) the Central European Basin, (c) the Southern European Basin, and (d) the Eastern (Siberia) Basin. The area from the Polish border east through the Volga system, which comprises the first three basins, contains the bulk of the Soviet inland water fleet. The planned distribution in 1950 allocated 79 percent of the self-propelled horsepower and 86 percent of the non-self-propelled tonnage capacity to that area.

The high degree of concentration of both tugs and barges in the Central European Basin indicates clearly that the cargo transport capacity of the Soviet inland water fleet is focused upon the Volga system (the Moscow Canal and the Volga, the Oka, the Kama, and the Moskva rivers). Distribution of the Soviet inland water fleet capacity, by basin, is shown in Table 3.

Table 3

Distribution of the Soviet Inland Water Fleet Capacity by Basin
Fourth Five Year Plan
1950

Basin	Fleet Capacity			
	Thousand Horsepower	Percent of Total	Thousand Metric Tons	Percent of Total
Northern European	174.0	19.0	1,365.0	19.5
Central European	422.0	46.4	3,870.0	55.3
Southern European	124.0	13.6	770.0	11.0
Eastern (Siberia)	192.0	21.0	995.0	14.2
Total	912.0	100.0	7,000.0	100.0

According to the Fourth Five Year Plan (1946-50) the Northern European Basin and the Eastern (Siberia) Basin are about equal in over-all cargo transport capacity. The Eastern Basin has more capacity in self-propelled vessels, but the Northern European Basin leads in barge capacity. The smallest portion of both tug horsepower and barge cargo-carrying capacity is found in the Southern European Basin around the northern and the western shores of the Black Sea. This apparent anomaly -- low water transport capacity in an area of industrial activity -- is explained by the facts that (a) rivers in the Southern European Basin are generally poor routes for traffic because of floods and droughts and that (b) many cargoes which might normally travel by water go instead by rail.

2. Ports.

The USSR possesses an excellent network of inland water ports. In the preparation of this report a primary list of about 250 ports was examined. These are situated throughout the USSR and vary in size from such major installations as Moscow and Astrakhan', whose cargo capacity approaches 25,000 metric tons daily, to small ports of primarily local importance. There are, however, 66 ports whose size, location, or traffic classify them as being of real significance to Soviet inland water transport. (For the names, locations, and principal cargoes of these ports, see Appendix A.)

Ports of major importance are scattered throughout the USSR, but there is a concentration in the area west of Astrakhan' (approximately 46°N-48°E). Despite the fact that this area comprises less than 15 percent of all Soviet territory, 58 percent (38 ports) of the 66 major ports are in the area west of Astrakhan'. There is also a noticeable north-south concentration, and few major ports are north of Leningrad or south of Astrakhan'. In the area of roughly from 46°N to 60°N are located 53 of the 66 major ports. Although it is obvious that geographic factors have something to do with the concentration of inland ports into a relatively small area, the decided geographic concentration of economic activity is directly reflected in the location of the river ports.

In 1940 the ports in the Central European Basin accounted for 68.6 percent of all ton-kilometers performed by the Soviet inland water fleet. The Northern European Basin is believed to be next in inland port capacity. In 1940 it accounted for 14.3 percent of all ton-kilometer performance. The Eastern (Siberia) Basin, comprising the area east of the Urals, is probably third in port capacity. Despite the paucity of large river ports, the Eastern (Siberia) Basin has numerous smaller ports, which enabled it to account for 11.2 percent of all ton-kilometers performed in

the Soviet river system in 1940. The ports in the Southern European Basin, roughly around the Black Sea, have the smallest capacity. In 1940 they accounted for only 4.1 percent of the total ton-kilometer performance of the inland water fleet.

Data on cargo capacity for individual river ports are not available, but there are several ports of major caliber by Western standards and many whose cargo capacity is at least several thousand metric tons a day. The Ministry of the River Fleet has stated that annually each of 14 river ports handle over 500,000 metric tons of cargo, that 26 ports handle from 200,000 to 500,000 metric tons, and that 30 ports handle from 100,000 to 200,000 metric tons. Even after allowance for propaganda and for the fact that timber cargoes form a large part of such traffic (about half of all river-borne cargoes), it is apparent that there are a number of ports of major importance for general cargo traffic.

On the basis of the statement of the Ministry of the River Fleet and such fragmentary data as are available, it is possible to make extremely tentative conclusions as to the capacity of Soviet river ports. A grouping of 200 river ports according to general cargo capacity might be approximately as given in Table 4.

Table 4

Estimated Daily Cargo Capacity of 200 River Ports in the USSR
1952

Daily Capacity a/ (Metric Tons)	Number of Ports	Annual Capacity b/ (Metric Tons)
25,000	2	10,000,000
10,000	12	24,000,000
5,000	6	6,000,000
2,500	30	15,000,000
1,000	50	10,000,000
500	100	10,000,000
Total	200	75,000,000

a. Excluding lumber in ships and rafts.
b. On basis of 200-day operation annually.

Although it should be emphasized that Table 4 gives the barest sort of estimate, it looks fairly reasonable. It is estimated that, in 1952, lumber transported in inland water ships and rafts totaled about 50 million metric tons* and that the total of all traffic was 118.6 million metric tons, leaving about 68 million metric tons of other traffic. (For traffic data, see Table 5.)** The close conformity of the estimated cargo capacity with the estimated traffic and continuing reports of efforts to achieve maximum operations lend credibility to the estimate given in Table 4.

3. Probable Trends.

a. Fleet.

(1) Size.

The Soviet inland water fleet will continue to increase in size during the next few years. The increment in both self-propelled vessels and barges will, in all likelihood, be considerably retarded by scrapping, particularly in the case of barges. The extent of such scrapping will be directly affected, however, by such factors as the availability of steel, propulsion equipment, production facilities, and labor.

* The 1950 Plan for lumber transport, which was not quite reached, called for the transport of 51.6 million metric tons.
** Table 5 follows on p. 13.

Table 5

Nature of Soviet Inland Water Traffic a/*
Selected Years, 1913 to 1945

Year	Total		Timber (Shipped)		Timber (Towed)		Oil	
	Million MT	Percent of Total	Million MT	Percent of Total	Million MT	Percent of Total	Million MT	Percent of Total
1913	33.7	100.0	N.A.	N.A.	N.A.	N.A.	5.3	15.6
1928	18.3	100.0	3.6	19.6	4.6	25.2	4.8	26.2
1932	46.9	100.0	6.7	14.3	19.6	42.0	7.4	15.8
1935	64.5	100.0	9.6	14.9	28.4	44.0	7.4	11.5
1940	73.7	100.0	7.4	10.0	32.5	44.1	9.5	12.9
1941 b/	87.0	100.0	9.3	10.7	40.0	46.1	10.9	12.5
1945	35.7	100.0	5.0	14.0	16.0	45.0	4.9	13.5

Year	Construction Materials		Grain		Other Cargoes	
	Million MT	Percent of Total	Million MT	Percent of Total	Million MT	Percent of Total
1913	N.A.	N.A.	5.9	17.5	22.5	66.9
1928	1.2	6.6	1.2	6.6	2.9	15.8
1932	5.4	11.5	2.6	5.5	5.2 c/	10.9 c/
1935	N.A.	N.A.	4.5	7.0	14.6	22.6
1940	7.5	10.2	5.1	6.9	11.7	15.9
1941 b/	8.4	9.6	6.0	6.8	12.4 d/	14.3 d/
1945	N.A.	N.A.	N.A.	N.A.	9.8	27.5

a. Excluding Caspian Sea Traffic.
b. Plan data.
c. Including construction materials.
d. Including construction materials and grain.

Judging by the rate of increase since World War II, however, the increase will be fairly slow. The self-propelled fleet will expand at the rate of about 6 to 8 percent, an increment of about 65,000 to 85,000 horsepower annually. Barge capacity is expected to increase at about the same rate, or possibly a little more, on the order of 7 to 10 percent, or about 600,000 to 800,000 metric tons annually.

(2) Quality.

It is probable that the quality of the Soviet inland water fleet will improve in the next few years. The authorities recognize the contributions which inland water transport can make and are anxious to achieve higher standards. For example, the Deputy Minister of the River Fleet stated last year that special ships are needed which must be able to navigate under ordinary river conditions, in shallow water, and in the "high waves" which will be the "characteristic feature" of the great water reservoirs (the reservoirs are not identified). This official said that Soviet scientists and builders have carried out research work to find out what ships should be built for the new waterways, especially for the Volga. It was stated that builders will have to construct ships with double bottoms; increase the steadiness of the river ships so they can be navigated without tipping, even under high waves; and diminish rolling of the ships. Better maneuverability and higher speeds are another goal. It was said that research carried on by Soviet scientists has proved that better design will increase ships' speed 1½ to 2 times without necessitating an increase in the power of the ships' engines. The official also spoke of building the first diesel electric river ship (dizel'-elektrokhod) for the Moscow-Rostov express line. The engine of the ship will develop 2,000 horsepower, he stated, and, capable of about 16 knots, will be the fastest in the river fleet.

Shipbuilders are also improving the performance of icebreakers for the river fleet. Two new types of icebreaker (the Don and the Volga) have powerful diesel engines, can travel at about 10 knots through ice 25 centimeters thick, and reportedly will be able to break ice up to 70 centimeters thick.

Soviet builders are also working on special types of ships for special uses. Among them will be pusher tugs, electric trawlers which will use electric power supplies from shore (probably for river fishing operations), and special cutters with water-jet-propelled engines (vodometnyy reaktivnyy dvigatel) which will navigate on irrigation canals and other shallow waters.

b. Ports.

The efficiency of the Soviet river ports will doubtless increase in the future, although not so much as in the past few years. Physical improvements should taper off now that war damage has been largely repaired in the essential areas. There should be also a slackening of the trend toward mechanization which took place in the past decade. From 1940 to 1950, the mechanization of loading and unloading operations in river ports increased 88 percent. (The total number of cranes used increased 3.8 times; the number of floating cranes, 6 times.) In 1950, 80.3 percent of loading and unloading operations were mechanized as compared with 46.4 percent in 1940. (It is not known whether these percentages apply to tonnage handled, to number of facilities at ports, or to number of ports.) Labor requirements have dropped 37 percent since 1940. Average production per worker has increased 172 percent, and productivity of loading and unloading operations has increased 1.5 times in this period. It is apparent that this rate of increase is too high to be maintained.

There will be increased construction of facilities, since ports and wharves are not keeping up with the additional burdens imposed on them by traffic for such major customers as the new hydroelectric and irrigation construction projects. One of the reasons for this is that port construction is lagging behind shipbuilding. Fleets have grown steadily, but wharf areas were not extended very much. One result of inadequate port and wharf facilities has been extended ship layovers. In mid-1951, ships were lying idle 30 percent of the operating time in Volga ports and 40 percent of the operating time in Dnepr ports.

III. Soviet Inland Shipping Operations.

A. Volume and Nature.

1. Volume.

It is estimated that the volume of traffic carried by the Soviet inland water fleet reached 105.6 million metric tons in 1951. Ton-kilometers totaled 51 billion. Traffic in 1952 was expected to total about 119 million metric tons, or about 59 billion ton-kilometers. (See Table 1*)

Detailed intelligence is not available on the geographic distribution of the volume of river traffic. Certain conclusions, however, are apparent as to the broad distribution of traffic. The Central European Basin, comprising the Volga system accounts for by far the major share of traffic. The 1950 Plan provided that 71.5 percent of all ton-kilometer

* P. 4, above.

performance would be provided in that system. The Northern European Basin, (the Mariinskiy Canal and the Western Dvina, the Northern Dvina, the Sukhona, and the Pechora rivers) is next in volume of traffic. In 1950 the Plan provided that this system would account for 11.8 percent of all ton-kilometer performance. The Eastern (Siberia) basin, the area east of the Urals, was scheduled to account for 10.6 percent of all ton-kilometers performed. The economically important Southern European Basin (comprising the Dnestr, the Pripet-Bug system, the Dnepr, the Don-Kuban, and the Donets), despite potential capacity for traffic, was scheduled to account for only 6.1 percent of all inland water traffic under the 1950 Plan. (For the distribution of Soviet inland water traffic by basin in 1940 and according to the 1950 Plan, see Table 6.)

2. Nature.

The traffic of the Soviet inland water fleet consists primarily of bulk cargoes and river transport of products such as industrial products and other finished goods, being important primarily in areas where other transport is lacking (for example, in Siberia). The major item of traffic is lumber, largely towed in rafts but also a large portion of barge traffic. The nature and relative importance of the major commodities carried by the inland water fleet are shown in Table 7.*

Table 6

Distribution of Soviet Inland Water Traffic by Basin
1940 and 1950 Plan

Basin	1940		1950 Plan	
	Billion Ton-Kilometers	Percent of Total	Billion Ton-Kilometers	Percent of Total
Central European	24.7	68.6	35.3	71.5
Northern European	5.1	14.3	5.8	11.8
Southern European	2.1	5.9	3.0	6.1
Eastern (Siberia) a/	4.1	11.2	5.2	10.6
Total	36.0	100.0	49.3	100.0

a. All of the area east of the Urals.

* Table 7 follows on p. 17.

Table 7

Major Commodities Transported by the Soviet
Inland Water Fleet
1950 Plan

Cargo	Million Metric Tons	Percent of Total	Billion Ton-Kilometers	Percent of Total
Timber in Rafts	43.0	47.0	18.8	38.1
Timber in Ships	8.6	9.4	3.4	6.9
Building Materials	10.5	11.4	2.2	4.5
Petroleum Products	9.5	10.4	13.3	27.0
Grain	5.7	6.2	2.8	5.7
Coal	4.0	4.4	2.0	4.0
Salt	1.7	1.9	2.4	4.9
Miscellaneous	8.5	9.3	4.4	8.9
Total	91.5	100.0	49.3	100.0

Although the actual performance of the Soviet inland water fleet in 1950 is estimated to have been somewhat lower than indicated in Table 4 (at 81.2 million metric tons and 45.2 billion ton-kilometers), the Plan clearly indicates the major items of traffic and their order of magnitude in inland water transport cargoes. (For principal cargoes in selected ports, see Appendix A.)

B. Major Routes and Systems.

Although there are numerous inland water routes and systems in the USSR, those of significance to the present study number only 17. (Those of purely local importance, such as the Kuban, are not included in this survey.)

Since this section deals primarily with the volume and nature of traffic on the inland waterways, only enough route information is presented to place each waterway in its geographic setting, and port descriptions are kept to a minimum. Physical data on routes are available in other surveys dealing with those aspects. Available descriptive data on river port facilities, other than those available to Western-flag ocean shipping, are so poor as to make their inclusion of little value.

1. Neva-Svir'-Lake Onega System (Central European Basin).

The Neva-Svir-Lake Onega route is the link between the Baltic ports, Leningrad, the northern coast of the USSR, and the northwest interior. It is passable for all types of river shipping and is important as a major traffic route from Leningrad to the north. The minimum depth of the route is 6 feet.

The Neva River carried 1.6 million short tons of cargo in 1935, and traffic has probably increased greatly since that time. Traffic is largely timber (75 percent of traffic in 1935); the remainder is made up of building materials, grain, and petroleum. (Petroleum is a small but probably essential part of total traffic.) In 1935 the Neva ranked first in traffic density in the USSR, carrying 4,444,000 short tons per mile downstream; upstream traffic totaled only 136,000 short tons.

Leningrad, at the mouth of the Neva River, is the only port of consequence on the route. It is a major river port in the USSR as well as being a major seaport.

Traffic on the Svir', like that on the Neva, is largely lumber, grain, petroleum, and building materials. Total cargo transported on the Svir' in 1935 was 2,370,000 short tons. Development of the Mariinskiy system leading southward will undoubtedly increase the volume of cargo on the Svir', with a probable significant increase in petroleum products.

2. Stalin (White Sea) Canal (Northern European basin).

The Stalin Canal is not of particularly great importance as a peacetime commercial route, although it has a minimum depth of about 12 feet. It is used primarily for the transport of lumber in rafts.

3. Mariinskiy System (Northern European Basin).

The Mariinskiy system of rivers, lakes, and canals (the Mariinskiy Canal; the Vytegra, Kovzha, and Sheksna rivers; Lake Beloye; and the Rybinsk Reservior between Lake Onega and the Volga) connects the Northern European Basin with the Central European and Southern European basin of the USSR. Since the controlling depth is about 5 feet, through traffic is confined to small vessels.

A great amount of traffic passes up the Sheksna River but does not continue beyond, indicating the limitations of the section north of Lake Beloye. The latest reliable figures (1935) show that only

166,000 short tons were carried on the Vytegra River, though 1,320,000 short tons traversed the Sheksna, of which the larger proportion was carried upstream. Timber is the greatest item of traffic on both routes, but grain, minerals, and building materials are also important.

Cherepovets is the leading port along the route. Located on the Rybinsk Reservoir, it has railroad connections and is accessible to large river craft.

4. Northern Dvina River System (Northern European Basin).

The Northern Dvina River and the Northern Dvina Canal connect the port of Archangel on the White Sea with the Sheksna River and the south. It is a shallow route with a controlling depth of 3 to 4 feet and is mainly important for the transport of lumber from the valley of the Sukhona and Northern Dvina rivers and as an alternate route for the Stalin Canal. In 1935, about 90 percent of all traffic on this system was timber.

5. Western Dvina River (Northern European Basin).

The Western Dvina River rises west of Moscow and flows into the Gulf of Riga. It is navigable for about 380 miles and, despite very shallow stretches (channel depths are unknown), is an important route. Upstream traffic carries basic materials such as coal and cement, and downstream traffic carries manufactured goods for export through Riga, its main port. Other important ports are Ogre, Daugavpils, and Vitebsk, which is situated at the upper limit of navigation.

6. Volga-Oka-Kama-Moskva River System (Central European Basin).

The Volga River is the backbone of the inland waterway system of the USSR. With a depth which ranges from 3 feet at Rzhev to 100 feet near Stalingrad, it is navigable for river ships all the way from the Caspian Sea to Rzhev, a distance of 2,325 miles.

The preeminence of the Volga and its tributaries is evident from Soviet statistics, which show that the Volga, the Oka, and the Kama rivers carry 47 percent of all river-borne commerce. The Volga alone accounts for 26 percent of the total, the section from Astrakhan' to Stalingrad accounting for 50 percent of this amount. The Volga carries about 2.5 times as much as any other Soviet river, and the Kama carries the next largest amount. Despite its great length, therefore, the Volga ranks high among Soviet rivers in tons carried per mile of route.

About half of all cargo carried on the Volga is petroleum from the Baku fields moving upstream from the Caspian Sea. The 1950 Plan provided for the movement of 7.54 million metric tons of petroleum on the Volga system out of a total of 9.5 million metric tons of petroleum moving in river transport. Grain is another major cargo on the Volga. The 1950 Plan provided for the carriage of 1.89 million metric tons of grain on the system. Salt alone totaled 1 million metric tons in 1946.

The actual volume of traffic on the Volga system is not known, but according to the Fourth Five Year Plan (1946-50) the system was scheduled to raise its turnover 43 percent over that of 1940. The Kama alone was to be used 155 percent more than in 1940. The Plan has not been completely fulfilled, but there has been an increase in traffic on the routes of the Volga system. Inauguration of the Volga-Don Canal probably will increase traffic to a considerable extent.

In 1935 the total cargo on the Oka River far exceeded that on its tributary the Moskva River (by 2 million short tons), especially in bulk oil products, indicating that the Moskva was navigable only for small boats and that much traffic sent up the Oka had to be transshipped by rail to Moscow. Since the opening of the Moskva-Volga Canal, however much of this traffic now uses the canal and thus avoids transshipment.

Ports on the Volga are too numerous to mention in detail. At least 10 are of major importance. These are listed below, starting at the mouth of the river.

Astrakhan' is the leading river port in the USSR. It is a major port for the transferring of petroleum, lumber, cotton, and fish from the Caspian roadstead fleet to river vessels and has major facilities for storing petroleum. The port is reported to have been largely rebuilt and 76 percent mechanized in 1946. (To what base this percentage figure applies is not known.) The port has rail connections, a telephone station for river navigation control, and ship repair facilities. It is accessible to the largest river barges but not to large Caspian Sea vessels.

Vladimirovka is a major port for petroleum and salt (the port handled 1,573,000 short tons of salt cargo in 1935). It is also a major transfer point for cargo to be transferred from the Caspian roadstead fleet to river vessels.

Stalingrad is the major point on the lower Volga for transshipping lumber and petroleum. In 1946 the port was reported to be 85 percent mechanized and to have been rebuilt. The port has rail connections and shipyards, and the harbor is accessible to the largest river barges. The port handled 4,785,000 short tons of cargo in 1935.

Saratov is of major importance as a port for lumber, grain, coal, fish, and petroleum. It is especially useful as a transfer point for petroleum and grain bound for the western areas of the USSR. It is accessible to barges with a capacity of 8,000 metric tons.

Above Saratov, Volsk is the next important port. It is useful as a port for cement, petroleum, and lumber. It has a railroad connection and is accessible to barges with a capacity of 8,000 metric tons.

Batraki is one of the lesser known Volga ports, important for the traffic of petroleum, coal, and salt. The port has facilities for the direct transshipping of petroleum between rail lines and large vessels. The port handled 663,000 short tons of cargo in 1935.

Kuybyshev is a key port for Volga traffic. Near the central point of the river, it is important for the traffic of lumber, petroleum, construction materials, grain, salt, and fish. It has a railroad connection and boatyards and is accessible to large barges. Kuybyshev handled 1,788,000 short tons of cargo in 1935.

Northwest of Kuybyshev, Gor'kiy is important for the traffic of petroleum, grain, cement, salt, machine tools, and finished industrial products. Gor'kiy handled 3,751,000 short tons of cargo in 1936. Largely mechanized, the port is reported to have been rebuilt. A major passenger port is also reported to be under construction at Gor'kiy.

Shcherbakov is the last major port on the Volga. A leading port for petroleum, grain, and building materials, it is accessible to large barges from the Moskva-Volga Canal, as well as to 3,000-ton barges from the middle Volga.

Moscow, although not actually on the Volga, is the largest port accessible to the route. It is one of the largest river ports in the USSR, and its function as a port plays an important part in its economy. The port is a major transshipment center. Located on the Moskva River, it is connected with the Volga by the Moskva-Volga Canal, which permits river vessels to proceed from Moscow to the Caspian. Projected improvements to the system, to unite it with the Gulf of Finland and the Baltic by means of large barges, will further increase its value.

There are three main freight ports in Moscow: the Northern, the Western, and the Southern, of which the Southern Port is the major one. There are, in addition, about a hundred minor cargo-handling areas. Port facilities include piers, stationary cranes, launches, and floating cranes. The port is equipped with excellent machinery to handle freight. Since the war, traffic is reported to have increased so much that in 1 month the Southern Port now handles as much freight as it formerly handled in the entire navigation season.

Cargoes moving up toward Moscow consist mainly of petroleum, grain, timber, and raw materials, shipped there from the lower reaches of the Volga, from the Baltic republics, from the Kama River, and from the White Sea. Finished manufactured products from the Moscow area bulk largest in traffic moving down toward the Volga. Moscow ships such products as trucks and passenger cars, fabrics, ball bearings, sugar, machine tools, and motors.

7. Dnestr River System (Southern European Basin).

The Dnestr River, 850 miles in length, rises on the northern side of the Carpathian Mountains and flows into the Black Sea southwest of Odessa. Shallow water (the maximum depth is about 10 feet) has in the past made the Dnestr of little consequence except for short-haul traffic of a local nature. Since the end of World War II, however, the USSR has devoted considerable effort to improving navigation, and the river is now of some value as a route for grain and timber moving southward to Odessa.

Khotin, Yampol', and Tiraspol are the leading ports on the route, but none of these is of great importance.

8. Dnepr River and Dnepr-Bug Canal System (Southern European Basin).

The Dnepr River, flowing through the Ukraine, is the largest river west of the Volga and could be a major route. Variation in depth (from 3 to 20 feet), however, limits its use. Its connection with the Baltic, via the Dnepr-Bug Canal, was completely destroyed during the war and has only recently been reconstructed. The actual status of reconstruction of the canal is not known, but it has been reported as fully restored and improved (its prewar controlling depth was 3 feet).

The Dnepr River system ranked fourth in inland water traffic in 1935, carrying 6 percent of all cargoes. The principal products carried are building materials. Though grain could be carried on the river in large amount, actual traffic in grain is relatively small, because the large grain markets are located to the north and to the northeast, away from water routes. Most of the grain, therefore, is moved by rail. In 1935, grain accounted for 389,000 short tons out of a total traffic load of 2.8 million short tons; the 1950 Plan provided for the river transport of 900,000 metric tons of grain. Timber shipments on the Dnepr are probably increasing. The 1950 Plan provided for the movement of 2.3 million metric tons of lumber in the Dnepr Basin, of which much was to come from the Karelian area. The Dnepr River system, furthermore, was scheduled to carry 477,000 metric tons of petroleum products in 1950. Soviet press reports offer further indications that the Dnepr is to be expanded as a route for traffic. A report by an official of the Dnepr Shipping Fleet stated early in 1952 that freight turnover in 1952 was scheduled to exceed that of 1951 by 18 to 20 percent and that the volume of freight between Kiev and Dnepropetrovsk was scheduled to increase 150 percent over the 1951 level.

Kiev is the major Dnepr port and is a trade center for the Ukraine. Restoration of extensive war damage and overhauling of port facilities were to have been completed by 1948. The river depth is about 10 feet in the Kiev harbor. Kiev handled 1,185,000 short tons of cargo in 1935. Dnepropetrovsk is another major grain transshipping port on the river. Gomel', on a tributary of the Dnepr, is important as a lumber transfer point. Dnepropetrovsk and Zaporzozh'ye, below Dnepropetrovsk, are major grain ports. The harbor installations of Zaporzozh'ye were designed for annual transshipment of 1 million metric tons, but they could be expanded to transship 5 million metric tons. The port is reported to have been rebuilt and modernized. The river depth off harbor is maintained at about 4.5 feet. The port handled 432,000 short tons of cargo in 1933. Kremenchug, between Kiev and Dnepropetrovsk, is of less importance as a grain port but is an important port for general industrial traffic.

The Dnepr-Bug Canal provides the only connection between the Black Sea and the Baltic Sea. It is limited, however, to small craft; its prewar limiting depth was 3 feet. Improvements on this canal probably have not been pushed, because of its proximity to the border and the danger of destruction in case of war.

9. Don River (Southern European Basin).

The Don River is about 800 miles long, and its depth ranges from 3 to 12 feet. Despite its potential value, the Don at the present time is of primary importance for grain transport. Grain is normally about 40 percent of all Don traffic, and coal and ore are second. Petroleum ranked third in traffic in 1935.

Completion of the Volga-Don Canal will greatly enhance the value of the Don as a route for traffic. When the Don is connected with the Volga, grain shipments in large volume will move to the cities on the Volga and reduce the strain on railroads in that area. The downstream movement of petroleum may also be important, although Baku petroleum destined for shipment from the Black Sea is usually piped across the Caucasus to Batumi.

The leading Don ports are Rostov, Kalach, and Svoboda. Rostov is a river port and seaport of major importance at present, and completion of the Volga-Don Canal will enhance the value of the Don to Soviet water transport. Soviet sources report that the river port of Rostov is being reequipped. New buildings for passenger traffic are being erected, as well as freight warehouses. Mobile cranes produced in the Krasnyy Flot works at Rostov will be installed at the port.

10. Amu Dar'ya River-Lake Aral System (Eastern European Basin).

The Amu Dar'ya River rising in Central Asia and flowing into Lake Aral, is navigable for 780 miles to Termez but is at present of little importance except for local traffic. Shallow throughout its course (3 to 10 feet in depth), it is mainly important as a source for irrigation of the desert area through which it flows. The river is a major factor in Soviet plans for further irrigation of that desert area.

There are several ports of local consequence, but Aral'sk on the north coast of the lake is the main port. According to Soviet reports, loading and unloading work at the port of Aral'sk is going on 24 hours a day. Powerful cranes and conveyer systems unload barges with Central Asian cotton, and freight from the railroad is loaded into ships bound for the Amu Dar'ya River. Much of the freight is destined for the construction of the Main Turkmenian Canal and other Central Asiatic projects. A Soviet press report stated that water transport of building materials to these projects during the first 4 months of 1952 exceeded by 15 times the total freight transported on the route in 1951. Allowing

for some exaggeration, it is apparent that completion of the main Turkmenian Canal, which will provide a navigable route from the Amu Dar'ya to the Caspian Sea and the inland water systems of the western USSR, will greatly increase the present importance of the Am Dar'ya to Soviet inland water operations.

11. Ob'-Irtysh-Tobol-Tom' River System (Eastern (Siberia) Basin).

The Ob' River; its chief tributary, the Irtysh River; and the latter's tributary, the Tobol River, constitute a waterway route in western Siberia extending from the Chinese border to the Arctic Ocean. They form a basin of 1.25 million square miles, the fifth largest river basin in the world. The Ob' has a total length of 3,225 miles from the mouth of Obskaya Bay to the source of the Katun. Measured from the origin of the Irtysh, the two rivers have a length of 3,500 miles. The Ob' is navigable nearly to its source by vessels which draw 6 feet, as well as by larger craft over most of the course.

These water routes are among the busiest of Asiatic USSR. Most of the traffic is concentrated in the middle and upper reaches of the rivers. The principal products of freight in the approximate order of volume are lumber, grain, petroleum, fish, industrial products and machinery, and mineral building materials. Detailed traffic data are not available, but before World War II the Ob'-Irtysh system carried more than 3 million metric tons of traffic annually.

Novosibirsk is the major port on the Ob'. It is about the fourth or fifth largest city in the USSR and is a center of industry. Reported to be completely mechanized, Novosibirsk is a leading trans-shipping point for traffic between the Altai region and the Trans-Siberian Railroad. The port is accessible to ships drawing 1.2 to 2 meters. Other important ports are, from south to north, Biysk, Barnaul, Kolpashev, Sugut, Samarovo, Berezovo, and Salekhard.

The Irtysh River is navigable for 2,400 miles. Although it is only 3 feet deep in its upper courses, it is 20 feet deep where it joins the Ob'. It rises in the southwestern slopes of the Mongolian Altai Mountains and flows into Lake Zaysan, and thence in a general northwesterly direction toward its junction with the Ob'. The main stream empties northward into the Ob', which gives access to Arctic waters and also affords an avenue of communications to the east. To the west there are connections with the northern and central Urals.

The Irtysh is a very important channel of communication in western Siberia. It has connections in many directions and is important for the transport of varied cargoes of grain, lumber, salt, petroleum, and building materials.

Tobol'sk, at the junction of the Irtysh with the Tobol, is more important for traffic on the Irtysh than for traffic on the Tobol. Omsk and Semipalitinsk are also important. Omsk is an important port for Irtysh traffic in coal, grain, petroleum, furs, and food products. It is reported to be modernly equipped and accessible to vessels with about a 6-foot draft.

The second most important tributary of the Ob' is the Tom', flowing 494 miles in a northwesterly direction to confluence with the Ob'. Although the Tom' is navigable from its mouth to the village of Abashevskiy, a distance of 370 miles, depths in the upper reaches are probably only about 2 or 3 feet (data on controlling depths are not available).

Traffic on the Tom' consists of the coal and minerals, which are sent from the Kuznets Basin to the main industrial centers. The Tom' is also a route of supply for grain, salt, fish, coal, mineral products, and coal cargoes for the workers of the Kuznets Basin.

The major port on the Tom' is the industrial center of Tomsk. It is a shipping point for the Kuznets Basin, accessible to medium-size barges (about 1-meter draft). Other large city ports on the Tom' are Kemerovo and Stalinsk.

12. Yenisey-Angara-Selenga River System (Eastern (Siberia) Basin).

The Yenisey River flows in a generally northerly direction into the Kara Sea from the mountains of Tuva ASSR (Tannu Tuva). It is navigable for 1,957 miles, and its minimum depth is 6 feet. Having many tributaries, it is one of the longest rivers in the world. In its lower reaches the river forms the Yenisey Gulf, 165 miles long and from 12 to 40 miles wide, ranging in depth from 150 to 450 feet. Of the numerous tributaries of the Yenisey, the Angara River is the most important. (The Selenga River flows into Lake Baikal from the south and is often not included in the Yenisey system.)

The Yenisey serves as a major north-south transportation route in western Siberia. The river is navigable as far as Oznachennoya, a distance of 1,957 miles. Traffic on that stretch of the

River is small in volume, however, because of swift currents and many shallows between Osnachennoya and Minusinsk. Navigation is best in the section downstream from Krasnoyarsk, where the river reaches a width of more than 2 miles and is at least 15 feet deep. The Krasnoyarsk-Yeniseysk segment is the section best equipped with waterway installations and carries the greatest volume of freight.

The main port on the Yenisey is Igarka, which is a major center for northbound lumber shipments over the Northern Sea Route. Large ocean-going ships can go upstream 450 miles to Igarka. Timber is handled ashore by modern gasoline and diesel camels and is loaded by ships' gear. The berths at Igarka are wooden, built only for the season, and they are invariably washed away in the spring thaw. Other major Yenisey ports are Minusinsk, Yeniseysk, Ust'-Port, Dudinka, and Krasnoyarsk. Dudinka is a new port, growing in importance because of the coal which is being mined near there. It has berths for two large ships, and four or five ships can anchor offshore and discharge into lighters. There is a small river-craft repair yard at Dudinka. Krasnoyarsk is a grain, lumber, and coal port. It has rail connections and a boatyard and is also a passenger traffic center. At full water levels, the port is accessible to boats of a 2.75-meter draft.

Lumber is the major northbound cargo in the Yenisey. Furs and fish are also an important part of the northbound traffic on the river. Passenger traffic on the river is comparatively large because of the lack of other means of travel. Building supplies and foodstuffs make up a major proportion of incoming products.

The Angara River, the major tributary of the Yenisey, rises in Lake Baikal and is about 1,200 miles in length. River depths range from 3 feet to 50 feet. The Angara is important principally because it is a feed line to Irkutsk, the great industrial center of the Lake Baikal region. The major products transported on the river are coal, iron ore, grain, and lumber.

The major ports on the Angara are Irkutsk, Bratsk, and Boguchany. Of these, Irkutsk is by far the most important. The port, an industrial center, handles grain and coal. It is on the Novosibirsk-Vladivostok rail line.

The Selenga River is relatively short and is navigable for about 450 miles from above its source into Lake Baikal. Though shallow (3 to 12 feet in depth), it is important because it is a water route for traffic between Mongolia and the Trans-Siberian Railroad at

Ulan-Ude. Although Ulan-Ude does not rank among the largest inland water ports in the USSR (it handled 112,000 metric tons in 1935), its connection with the rail line makes it of great strategic value. Ulan-Ude is an important port for grain and petroleum. The port is accessible to ships drawing up to 1 meter at mean water.

13. Lena River System (Eastern (Siberia) Basin).

East Central Siberia depends for its freight transportation almost entirely upon the Lena River and its major tributaries, the Aldan, Vitim, Olekma, and Vilyuy rivers. At the upper reaches (between Kachug and Ust'-Kut) the depth is a minimum of 15 inches, and between Ust'-Kut and Kirensk the limiting minimum depth is 3 feet. Below Kirensk, however, the river is navigable to its mouth for river steamers, the shallowest section being 4 to 6 feet between Kirensk and Vitim. Below the Vitim the depth runs from 8 to 50 feet, with an average of from 13 to 20 feet.

Although traffic on the Lena is comparatively light, the river is of importance as a rear supply route for the Lake Baikal area and furnishes a connection to the Northern Sea Route. Most traffic is carried on the upper reaches of the river. In 1945, over 33 percent of all inland shipping in the Soviet Far East was concentrated in the upper and middle courses of the Lena.

The normal annual freight traffic on the Lena runs around 125,000 metric tons, of which 39 percent is lumber, 24 percent grain, and 9 percent coal mined near the Vilyuy River. The remainder is made up of salt, sugar, machinery, metal goods, furs, and gold from numerous fields in the area.

The major port on the Lena is Yakutsk, which is the supply center for the whole area of northeastern Siberia and is being developed extensively. It exports lumber and imports a variety of industrial products. Although Yakutsk handled only 107,000 metric tons of cargo in 1935, its volume is expected to reach 1 million metric tons annually. Tiksi, situated near the Lena River delta, is a major port of the Northern Sea Route and also acts as a transshipment point for cargo to and from Yakutsk.

14. Kolyma River System (Eastern (Siberia) Basin).

The Kolyma River, formed by the confluence of the Kulu and Ayan-Yuryakh rivers, lies in the northeastern section of Siberia. The river flows in a northerly and northeasterly direction to the East Siberian Sea and is navigable from its mouth to a distance of 1,220 miles. It is 60 feet deep in its lower course, falling to 5 feet toward its source.

The Kolyma is of major importance in the inland water system of the USSR as the primary means of transport from the gold fields and coal mines in the Kolyma Basin. The river is the only means of importing heavy machinery and exporting bulky ores to and from Seymchan, and it has played a vital role in this exploitation. (An automobile highway from Magadan on the Sea of Okhotsk to Seymchan is used mainly for winter transport in this area.)

Ambarchik, one of the main ports of the Northern Sea Route, is located close to the delta of the Kolyma and is the transshipment point for goods and supplies which travel up and down the river. The major terminal port at the upper end of the river is Seymchan. Other ports are Zyryanka, Verkhne-Kolymsk, and Nizhne-Kolymsk.

15. Amur-Ussuri-Sungari River System (Eastern (Siberia) Basin).

The Amur River has a very important economic position in the Far Eastern USSR. It is navigable for ocean-going vessels from its mouth up to Khabarovsk (up to 40 feet in depth), a distance of 600 miles. It is open to vessels of 7-foot draft for 600 miles further, where the controlling depth ranges from 3 to 12 feet. Statistics for 1943 show that 2.2 million metric tons were carried on the Amur, and the increasing development of this sector has placed an even greater load on the river. Lumber, grain, and industrial goods are the main commodities of traffic. Sakhalin petroleum moving over the Amur to be refined at Khabarovsk constitutes about 10 percent of the total traffic. Komsomol'sk is the most important Amur port, followed by Nikolayevsk and Khabarovsk, which has large facilities for storing petroleum.

The Ussuri and Sungari rivers, tributaries of the Amur, are of slight value to Soviet river transport capabilities, despite the fact that they are relatively long and flow northward from Manchuria. They are rather shallow, and their navigability is generally poor.

16. V. I. Lenin Volga-Don Ship Canal (Southern European Basin).

Despite the fact that it was recently put in operation, the V. I. Lenin Volga-Don Ship Canal (Volga-Don Canal) is of such significance to Soviet inland water capabilities that its role must be considered in any study of Soviet inland water traffic. This 60-mile route, connecting the Don with the Volga below Stalingrad, will be of the greatest

economic and strategic importance to the USSR. It will afford a route for medium-draft (about 12 feet) ships from the Black Sea to the Caspian Sea and to the heart of the USSR.

Traffic will consist largely of bulk cargoes such as grain, coal, and timber.

In addition to the ports of Rostov-on-Don and Stalingrad on the Volga which will be beneficially affected by the operation of the Volga-Don Canal, three other ports will serve the Volga-Don traffic. Ust-Donets will handle cargoes of coal and pit props. Soviet sources say that new mechanisms will permit the loading of a 3,000-ton vessel in a few hours. Tsimlyansk, which was to enter service in 1952, is to be a transshipping center of timber from water to rail en route for Stavropol' and nearby areas. The port is to be equipped with portal and floating cranes, fork-lifts, and wood-hauling machines. Kalach will be a port for grain, chemical fertilizers, and petroleum traffic transshipped from small craft plying on the Upper Don to large Volga barges. New wharves and handling equipment are being installed.

17. Danube River (Southern European Basin).

The Danube River is the only river which the USSR shares to any important degree with another country (the participation of Afghanistan in traffic on the Amu Dar'ya is negligible, and Soviet-flag operations on routes such as the Dnepr-Bug Canal and the Sungari River in Manchuria are believed to be unimportant).

Until 1940, when the USSR forced from Rumania the cession of territory along the north bank of the river, the Danube did not flow through Soviet territory. Acquisition of part of the river, however, made the USSR a Danube riparian country, a position which it has actively exploited.

River traffic operations are carried out by the Soviet Danubian State Steamship Company (Sovetskoye Dunayskoye Gosudarstvennoye Parokhodsto). The company was organized after World War II to exploit river traffic with the Satellites; it also engages in ocean-going traffic. The river-borne trade moves in a small fleet of ships, mostly tugs for towing barge cargoes of grain, ores (bauxite), and petroleum down the river to rail transshipment points, as well as directly to Soviet ports on the

Black Sea. Soviet trade on the Danube destined for the USSR is carried primarily in Soviet vessels, and the Satellite fleets participate only to a slight degree. For example, Rumanian and Hungarian tankers seldom proceed to Soviet ports, but instead discharge their cargoes into Soviet tug-barge units for transport to the USSR.

The only Soviet Danube ports of importance are Reni, Izmail, and Kiliya Nova. The port of Kiliya Nova is located 47 kilometers upstream from the mouth of the Kiliya arm of the Danube, on the left bank of the river across from the Rumanian town of Kilia Veche. Kiliya Nova has a ships' landing stage in about 15 feet of water and has emergency winter facilities. The port facilities are chiefly used for handling grain. There is also a small shore-based Soviet Naval Command. The port of Reni is becoming an important hub of commerce between the Balkan Satellites and the USSR. Petroleum from Ploesti comes to Reni by barge and is then brought to the Ukraine by railroad. A petroleum pipeline from Ploesti to Reni is presently reported to be under construction but not yet completed. Petroleum from Ploesti is also brought by railroad as far as the Rumanian port of Giurgiu, where it is loaded into barges and sent to Reni.

The Reni facilities for receiving petroleum consist of a small pontoon dock of two old barges on which there is a pump. One source reports that this dock can handle two tankers simultaneously, each tanker unloading in 8 hours.

Port facilities at Reni consist of railroads served by four large stationary cranes; two mobile, tracked cranes; and two conveyer belts, which are served by the cranes and extend from the water's edge to the railroad tracks. Cement, machinery, and iron ore from Hungary, Rumania, and Czechoslovakia are sent from Reni to the USSR. Part of the shore is reported to be covered with large stocks of bauxite from Hungary awaiting transshipment to the USSR, as well as pyrites from the USSR awaiting shipment to the Satellite countries. There is also a large grain elevator for Rumanian wheat awaiting shipment to Czechoslovakia in payment for Czechoslovak machinery delivered to the USSR.

Izmail is above Reni. The chief river traffic of Izmail is the importation of bauxite and the exportation of pyrites. Some grain also arrives there from Rumania and Hungary. Petroleum traffic appears to be slight. Bauxite and pyrites are unloaded from barges by means of cranes into railroad cars. The quay at Izmail, which is in the center of the port area, is built of stone with a paved surface and is about 500 meters long. Along the quay there are several types of cranes ranging from nine electrically operated cranes which run along a track parallel to the quay to various types of mobile cranes mounted on caterpillar treads. The

electric cranes have a 5-ton capacity, and one which was constructed in the Ganz Works at Budapest is brand new. There are about 10 caterpillar cranes, varying in capacity between 1 and 1.5 metric tons, and there are 2 mounted on rubber treads. In addition, there are 2 floating cranes on the Ganz type, 1 steam-operated and 1 motor-operated, whose capacity is believed to be between 3 and 5 metric tons. Barges tie up broadside to the quay, sometimes two and three abreast, and the electric cranes are used to unload them into the first line of railroad cars on the track nearest the quay. The mobile cranes are used for the other tracks. The port has at least 2 service tugs of 150 to 200 horsepower used for moving cargo about in the port.

IV. Significance of Inland Water Traffic to the Economy of the USSR.

The Soviet economy is geared to rail transport, but the vital importance of water transport in some aspects of the economy is apparent. Soviet inland water transport amounts to only 8 or 10 percent of total ton-kilometer performance, in contrast to about 15 percent in the US. The Volga, for example, carries about three-fourths of the load transported by the Ohio River and its tributaries.

Inland water transport of heavy freight is of critical importance in several strategic regions such as northern Siberia, which, for all practical purposes, depends on water transport, particularly river transport. Freight movement in the regions adjacent to the Okhotsk Sea and the Bering Sea is almost exclusively by water. Cargoes move into Siberia from European USSR by means of the Trans-Siberian Railroad to junctions such as Omsk, Novosibirsk, and Krasnoyarsk, where they are reloaded on river boats at the junctions of the railroad with the rivers moving north or south.

The river routes also make an important and often overlooked contribution to the Soviet position in foreign trade. Grain and lumber exports are the chief sources of Soviet foreign exchange, and without inland water routes the large-scale movement of these cargoes to sea ports for transport abroad would be greatly handicapped.

Soviet waterways must also be evaluated on the basis of the commodities which they move. Although the rivers carry their greatest loads in timber and mineral construction materials, which are of considerable economic value but of little strategic importance, they also move much oil and grain, which are of great economic and strategic importance to the USSR.

Inland water routes also are important in joint hauls to relieve rail lines. By joint hauling, inland water routes relieve the rail lines of a large part of the burden of hauling many bulk cargoes from their point of origin to their ultimate destination. Such joint hauling is of special importance in the transport of timber, building materials, petroleum, grain, and coal, which account for by far the largest part of all inland water traffic. In some cases the water route constitutes a small part of the total distance which such cargoes must travel, but in others (the petroleum traffic on the Volga, for example) the water haul constitutes the major portion of the distance from origin to destination. The extent to which river traffic relieves rail lines of long hauls of bulk goods is illustrated in Table 8.

Table 8

Typical Transfer Points for Soviet Inland Water Traffic

Area of Origin	Transfer Point	Destination	Type of Transfer
Timber			
Upper Kama	Astrakhan'	Donets Basin	River to Rail
	Stalingrad	North Caucasus	River to Rail
	Saratov	Transcaucasia	River to Rail
Dnepr Basin-West Dvina	Gomel'	Ukraine	Rail to River
	Pskov		
	Zhlobin		
Tavda-Sos'va	Tavda	Urals	River to Rail
Lower Irtysh	Omsk	Karaganda	River to Rail
Upper Ob'	Barnaul	Central Asia	River to Rail
Tom' Basin	Tonsk	Kuznets Basin	River to Rail
Petroleum Products			
Baku	Batumi, Odessa	Dnepr Basin	Pipeline-Sea-River
	Astrakhan', Volga	Siberia	River to Rail
	Astrakhan', Batraki	Kazakhstan	River to Rail
	Astrakhan', Cherepovets	Leningrad	River to Rail
	Astrakhan', Saratov	Central RSFSR	River to Rail
Kama ("Second Baku")	Ufa	Central RSFSR	River to Rail

Table 8

Typical Transfer Points for Soviet Inland Water Traffic
(Continued)

Area of Origin	Transfer Point	Destination	Type of Transfer
Grain			
Kazakhstan	Saratov	Upper Volga	River to Rail
Coal			
Vorkuta	Kotlas	Archangel	Rail to River
Donets Basin	Krasnoarmeysk	Upper Volga	Rail to River
	Dnepropetrovsk	Dnepr Basin	Rail to River

Another significant measure of the value of inland water transport is the great emphasis which the Soviet government itself presently lays on river traffic as seen from the extent of the restoration and construction programs, as well as from the propaganda campaign waged for the popularization of water transportation to relieve the burden on rail lines. Among the first reconstruction projects of the USSR was the restoration of the Baltic-White Sea Canal, whose locks had been destroyed in World War II (their exact status is not known). This section is all the more significant, since the route is important primarily for the movement of lumber; it has great strategic importance, however, as an inland route for the movement of naval vessels. The great emphasis laid upon the Volga-Don Canal and the furor over its "completion" (it is probably not yet in full operation) is another instance of Soviet efforts to expand the operation of inland water transport.

APPENDIX A

SOVIET RIVER TRAFFIC:
PRINCIPAL CARGOES IN SELECTED PORTS a/*

Port	Coordinates (Degrees) North	Coordinates (Degrees) East	Route b/	Traffic
Achinsk	56	91	Chulym	Manganese
Anadyr' c/	65	177	Anadyr'	Lumber
Archangel c/	64	41	Northern Dvina	Lumber
Astrakhan' c/	46	48	Volga	Oil, grain, lumber, fish
Barnaul	53	84	Ob'	Lumber
Batraki	53	48	Volga	Grain
Belomorsk c/	65	34	Stalin Canal	Lumber
Blagoveshchensk	50	127	Amur	Grain
Bryansk	53	34	Desna	Fertilizer, building materials
Dnepropetrovsk	48	35	Dnepr	Coal
Dudinka	70	86	Yenisey	Lumber
Gomel'	53	31	Sozh	Paper, potatoes
Gor'kiy	56	44	Volga	Lumber
Gur'yev c/	47	52	Ural	Oil
Igarka c/	67	86	Yenisey	Lumber
Irkutsk	52	105	Angara	Plywood, mica
Kaliningrad c/	55	20	Pregel	Pulpwood
Kazan'	56	49	Volga	Lumber, coal, oil, chemicals
Khabarovsk c/	49	135	Amur	Grain, lumber, oil cement
Khar'kov	50	36	Orel'	Flour, sugar, industrial machinery
Kherson c/	47	32	Dnepr	Cotton, wheat
Kiev	51	31	Dnepr	Industrial machinery, lumber
Klaypeda c/	56	21	Neman	Pulpwood, fertilizer
Kolomna	55	39	Oka	Locomotives, rolling stock
Komsomol'sk c/	51	136	Amur	Steel, lumber, industrial equipment

* Footnotes follow on p. 37.

Port	Coordinates (Degrees) North	East	A Route b/	Traffic
Kostroma	58	41	Volga	Textiles, lumber, grain
Kotlas	61	46	Northern Dvina	Lumber
Krasnoarmeysk	51	46	Volga	Coal, oil
Krasnoyarsk	56	93	Yenisey	Lumber, pulpwood
Kuybyshev	53	50	Volga	Lumber, grain
Leningrad c/	60	30	Neva	Lumber, pulpwood
Minsk	54	27	Svisloch'	Machinery tools, textiles
Molotov	58	56	Kama	Fertilizer, chemicals, lumber
Molotovsk c/	64	40	Northern Dvina	Lumber, pulpwood
Moscow	56	37	Moskva	Industrial equipment, oil, grain
Nikolayev c/	47	32	Southern Bug	Grain, cotton, sugar, iron, ore
Nikolayevsk c/	53	141	Amur	Grain, oil
Nordvik c/	74	111	Khatanga	Lumber
Novosibirsk	55	83	Ob'	Machinery, textiles, flour
Odessa c/	47	30	Dnestr	Grain, lumber, oil, cement
Omsk	55	73	Irtysh	Lumber, coal
Onega c/	64	38	Onega	Lumber
Pavlodar	52	77	Irtysh	Coal
Petropavlovskoye	55	69	Ishim	Flour, meat, leather
Petrozavodsk	62	34	Lake Onega	Cement, industrial machinery
Pinsk	52	26	Pripet	Lumber, paper, fish
Poti c/	42	41	Rion	Manganese, lumber, grain
Riga c/	57	24	Western Dvina	Lumber, grain, machinery, paper
Rostov c/	47	40	Don	Industrial machinery, grain
Saratov	52	46	Volga	Oil, grain, textiles, machinery
Seymchan	63	153	Kolyma	Gold Mine equipment
Shcherbakov	58	39	Volga	Machinery, lumber
Solikamsk	60	57	Kama	Potash salts, coal
Stalingrad	49	44	Volga	Oil, grain, machinery

Port	Coordinates (Degrees) North	East	Route b/	Traffic
Stalinsk	54	87	Tom[c]	Steel, ferrous ores
Syzran[c]	53	48	Volga	Oil, lumber, leather
Tavda	58	65	Tavda	Lumber
Tobol'sk	58	68	Tobol	Lumber, furs
Tomsk	56	85	Tom[c]	Grain, lumber
Ust'-Kut	57	106	Lena	Grain
Vil'nyus	55	25	Viliya	Paper, agricultural equipment, fertilizer
Vitebsk	55	30	Western Dvina	Textiles, lumber
Vladimirovka	48	46	Volga	Salt
Yakutsk	62	130	Lena	Lumber, agricultural products
Yaroslavl'	58	39	Volga	Lumber, trucks, buses
Zhlobin	53	30	Dnepr	Lumber

a. This list is not intended to comprise all ports and all categories of traffic. Ports are selected on the basis of their size, location, nature of traffic, and other factors. Cargo data are illustrative of important commodities handled in port.
b. In some instances the route shown is an affluent of a main system.
c. Also accessible to other water routes.